B U L L E T I N

of the

United States Institute for Textile Research, Inc.

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T. R. I. BULLETIN

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United States Institute for Textile Research, Inc.

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FOREWORD

This is the first of a series of bulletins designed to keep members informed as to the activities and accomplishments of the Board of Directors, Executive Committee and Research Committee which with the President are the Institute's motivating and operating bodies.

Since the organization meeting November 6, 1930, there have been held four meetings of the Executive Committee and three of the Research Committee, and this Bulletin is devoted in large part to their activities.

It is planned gradually to expand future Bulletins to include research abstracts and bibliography until such time as Institute research work obliges the publication of regular printed volume.

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T. R. I.

T. R. I. (pronounced try) is the official abbreviated designation of United States Institute for Textile Research, Inc.

Its use among members and in correspondence with them was approved by the Executive Committee at its meeting January 13, 1931, after various methods of abbreviating the long official title had emphasized the desirability of a standard form.

T. R. I. as officially pronounced, is a fitting slogan for an organization devoted to fundamental research. Your President is responsible for it. He has not, however, given his approval to the following literary effort of your Secretary:

> If at first your don't succeed,
> T. R. I. scientifically. -With
> apologies to Anon.

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Your President Was the Guest and principal speaker at the annual dinner of the Rhode Island Textile Association, Providence, R. I., January 27. His address on fundamental research, and the textile industry's need of cooperative effort of this character was extemporaneous and it is to be regretted that not even an abstract of it is available.

THE NEW YORK MEETING, February 24.

Originally called as the first quarterly meeting of the Board of Directors, with sessions of the Executive Comittee and Research Committee

also scheduled, the meeting at the Chemists' Club, New York City, Tuesday, February 24, has expanded into a meeting, reception and luncheon of the whole membership.

A meeting of the corporation membership is necessary if the amendment of Section 2 of Article II of the By-Laws, which is to be favorably reported to the Board of Directors by the Executive Committee, is to be adopted. The meetings of the corporation and of the Board of Directors have been called for the same hour--2 p.m. The directors will meet first and act upon the amendment as reported by the executive committee, after which they will adjourn temporarily and the meeting of the corporation will be called for action upon the amendment; this will be brief, after which the directors will re-convene and the members will be privileged to sit in at that meeting as observers.

The morning program calls for a meeting of the research committee at 9 a.m. and of the executive committee at 11 a.m. A reception by President Stratton will be held in Room A of the Chemists Club at 12:30 p.m. and will be followed by luncheon at 1 p.m. at which President Stratton will speak informally.

The reception and luncheon provide the first opportunity since organization of the Institute November 6, 1930 for President Stratton to meet the members of the corporation, and for the latter group of more than 100 research-minded textile men to promote mutual acquaintance.

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THE LIST OF ORIGINAL MEMBERS in booklet form should have been received by all members with the call for the February 24 meeting. "Original Members" as defined by vote of the Executive Committee November 21, 1930 was expanded to include not only those who had qualified at the date of the first annual meeting, but also those who qualified by election prior to January 1, 1931.

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ENGROSSED PARCHMENT CERTIFICATE of Membership will be mailed in the near future to all members of the corporation who were elected prior to and including November 21, 1930, and, in addition to those contributing and higher class memberships which qualified prior to January 1, 1931. These certificates are suitable for framing, and it is hoped that they will be given a conspicuous place in members' offices, thus gaining valuable publicity for T. R. I.

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THE INCORPORATION CERTIFICATE of U.S. Institute for Textile Research, Inc., was filed in the office of the Secretary of the State of New York December 17, 1930. The incorporation is under the Membership Corporations Law of New York State and covers important extension of the purposes and powers of the original certificate which was transferred to U.S. Institute by Textile Research Council, Inc.

Under the Membership Corporations Law operation for profit is prohibited, but very broad powers are granted U.S. Institute "to promote, cultivate and

facilitate scientific research in connection with the production of textile raw materials and their utilization in the textile manufacturing industries of the United States". The details of incorporation were handled by Dr. E. H. Killheffer, chairman of the incorporation committee.

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More Contributing Members Needed

By vote of the Executive Committee, "any members qualifying for higher-class memberships may be credited with such part of their dues or fees as have been paid within the current fiscal year on lower-class memberships".

This means, for instance, that for $90 additional an annual member may become a contributing member.

Only the dues paid by annual and contributing members are available for current expenses, and U.S. Institute's greatest present financial need is for funds of this character.

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THE FIRST LIFE MEMBER elected by T. R. I. was Pacific Mills, represented by Treasurer A. E. Colby. In addition, Pacific Mills has taken out seven annual memberships for key men at its various plants North and South.

THE SECOND LIFE MEMBER to qualify was the American Association of Textile Chemists and Colorists. This Association, which played an important part in the organization of T. R. I. demonstrated its faith in our organization by appropriating the fund that it had voted in 1929 for the work of its research conference committee. This Association also holds a contributing membership in T. R. I. and a large number of its members have joined.

Textile Research Council, the other organization that was most influential in promoting T. R. I., has demonstrated its faith in the soundness and permanency of U.S. Institute by voting the transfer to T. R. I. of its incorporation papers, by disbanding, and by transferring to T. R. I. its small surplus of $110. More than two-thirds of its members already have joined T. R. I.

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Textile Foundation Survey

A committee consiting of Dr. W. E. Emley, chairman of the Research Committee, E. D. Walen and Prof. E. R. Schwarz, has been appointed by the President to cooperate with him and the Secretary in planning and conducting a textile research survey which T. R. I. has been authorized to make for The Textile Foundation, and for which the latter has provided a grant of $5,000.

In the near future the first survey questionnaire will be mailed and will cover the following purposes:

(1) Assembling of data about all organizations and individual companies engaged in research on textile subjects

(2) The character and scope of such research.
(3) The results already obtained.
(4) Plans for (future) research, and similar basic information.

The broad scope of the survey was further explained by the President at the last meeting of the Executive Committee as follows:
"It is information regarding textile researches in progress and existing research facilities that is most desired. It should also cover economic researches that are an essential approach to, or part of, scientific or technical research. It may also include researches on raw materials that originate with producers, but that are likely to result in substantial improvement, or lowering the cost, of manufactured products. Likewise textile researches conducted by distributors or their organizations, that are designed to improve or lower the cost of manufactures, or increase their sales, would be classified in this survey."

The Textile Foundation was authorized by act of Congress last year to administer for scientific and economic research a fund of approximately $1,300,000 accumulated by the Textile Alliance during its supervision of the allocation of war reparation dye stuffs from Germany.

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Research Committee Activities

The Research Committee has held three meetings since the annual meeting November 6, and its chairman, Dr. W. E. Emley, has had several additional conferences with your President, Secretary and members of the committee.

The Activities of the Committee have become so numerous and pressing that expansion of its membership and organization of sub-committees are necessary. The original membership of eight has been expanded to ten by the appointment of E D. Walen, Agent, Worsted Division, Pacific Mills, Lawrence, Mass., and Prof. E. R. Schwarz of M.I.T. Additional appointments will be announced at the New York meeting.

Of Four Major Research Problems recommended by the Committee to the Executive Committee two are the subject of fundamental research at the Bureau of Standards and Massachusetts Institute of Technology, both of which institutions have qualified as Participating Laboratories of T. R. I. These subjects are as follows: (1) A Scientific Study of the Wear of Fabrics and the Development of Methods for Resistance to Wear; (2) Investigation of the Relative Suitabilities of the Present Methods for Testing Yarns.

"Development of Testing Methods for the Fastness of Dyes" is the third major research subject suggested by the Research Committee. The fastness of dyes has been the subject of research by the American Association of Textile Chemists and Colorists for several years, and their efforts have been officially recognized by The Textile Foundation which has granted them $5,000 for extension of this research.

"A Study of the Causes of Shrinkage of Cotton and Wool" is another major subject that remains to be allotted, and numerous additional subjects for research are under consideration.

Sub-Committees of the Research Committee authorized for early appointment and organization are as follows: Bibliography and Abstracting; Machinery; Economics. Another on Nomenclature has been proposed. Various sub-committees must also be appointed for the major branches of the industry--cotton, wool, silk, rayon.

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T R. I. Research Defined

Two Types of Research as defined for major activities of T. R. I. and adopted by the Executive Committee are as follows:

Fundamental Research of a Public Nature on subjects selected by the Research Committee and approved by the Executive Committee, such investigations to be made by Participating Laboratories, the results to be available to all members and eventually to the public.

Private Research on Problems Submitted by Members, in connections with which U.S. Institute will act only in an advisory or consulting capacity, the results of the research being the private property of the member, or members, financing the project. The advisory work of U.S. Institute might include among other things compilation of a bibliography on the subject; advice as to the method of organizing the research; placing the member or members in touch with the laboratory or laboratories best staffed and equipped to conduct the research. Nothing regarding these private researches would be published by U.S. Institute unless authorized to do so by the member or members involved.

RESEARCHES AND RESEARCH ABSTRACTS

This department of the Bulletin eventually will become one of its most important features or of the proposed Textile Research Review.

The few subjects covered in this issue have been selected for their timely interest, but as yet neither form nor character of abstracts have been decided upon.

A STUDY OF YOUNG'S ERIOMETER AND ITS APPLICATION IN THE GRADING OF WOOL.- By H.J. McNicholas and H.J. Curtis, Bureau of Standards, Washington D.C.

The average diameter of wool fibers is a dominant dimensional characteristic of the material which serves as the present basis for the classification into grades. Sets of wool standards have been established for the industry based entirely on the average diameter of the fibers. In present trade practice the actual routine grading is done by men of long experience in the industry who merely by observing and handling the material assign it intuitively to its proper grade. There is no suitable instrument available for the rapid, convenient and accurate evaluation of wool on the established basis.

A simple rapid optical method for measuring the average diameter of a group of fibers was devised by Thomas Young (Miscellaneous Works, Vol. 1, p. 343; 1855) in 1824, but no thorough investigation has ever been made of the practical possibilities of this method in the grading of wool. The method is based on the phenomenon of diffraction, which is manifested when a line-source of light is viewed through a bundle of fibers which are arranged approximately parallel to one another and to the source. Under these conditions a banded light distribution is seen extending laterally and symmetrically on both sides of the source, and the separation of the bands bears a well-known relation to the average diameter of the fibers.

The present instrument is a new construction of Young's eriometer in which a stationary artificial light source is used and more convenient and accurate means are supplied for determining the separation of the diffraction bands.

In a study if the performance of the instrument, diameter measurements have been made with the eriometer and with a microscope on wool and other textile fibers. The samples studied covered a range of average diameters from 13 to 50 microns.

From the microscope measurements on 12 wool samples diameter-frequency distribution curves were obtained, illustrating the wide range and varied distribution of diameters which may be collected into a single averaged result by the eriometer. On the average, this range of variations extends to ± 40 per cent from the mean with an average deviation of roughly 10 per cent. The diffraction method is not suitable for the averaging of all possible diameter distributions. It is inherent in the method that the diameter distribution curve should not be very flat or irregular. For best results these should be pronounced concentration of diameters about the mean.

Within the range of applicability of the instrument it is found that the precision and accuracy obtainable is quite sufficient for the intended purpose. The eriometer averages for the samples studied all fall within 2 microns of the corresponding values obtained by averaging many individual determinations with the microscope.

An investigation has been made of sources of error arising from irregularities in form and orientation of the fibers, such that the theoretical condition of parallelism between the fibers is not fulfilled closely. This possibility of error may be reduced to negligible proportions by reasonable care in the mounting of the fibers and is not regarded as of serious practical importance.

A complete description of the instrument and its operation will appear shortly in the Bureau of Standards Journal of Research. In this paper further developments in the construction of the eriometer are outlined by which a greater total length and number of fibers may be observed and some quantitative information on the dispersion of diameters obtained. On the whole the diffractive method appears to afford considerable opportunity for the further development of instruments to include these additional features.

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CARPET WEAR TESTING MACHINE.- Bureau of Standards, Washington, D. C.

A machine for testing the resistance to wear of carpets and similar floor coverings when they are subjected to definite wearing forces under controlled conditions has been developed at the Bureau of Standards. The forces are chosen to produce the bending, slipping, twisting, and compression of the pile which takes place when a carpet is walked upon.

A circular sample of the carpet to be tested is tacked on a turntable which is brought to bear against two leather covered wheels. One of the wheels is driven by a motor and in turn drives the turntable. The other wheel is used as a brake to produce slipping of both wheels on the carpet as it rotates. A vacuum cleaner removes the material which is worn off. The wear on the carpet is produced by a downward force, a horizontal stress and a slight twisting motion. They have definite values and may be varied. The rate of wear is evaluated by measuring the change in thickness of the pile of the carpet with a sensitive thickness gauge as the test proceeds.

The machine can be used to test the relative durability of carpets under definitely specified conditions. Whether the results are a satisfactory measure of probable relative durability of carpets in service has not been determined The machine should be useful for studies of the effect of various factors on carpet wear and for studies of the relation between the composition and construction of carpets and their resistance to wear.

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BIBLIOGRAPHY

This department eventually will cover the most important of current literature pertaining to textile research and technique. A brief description of the character of the subject will accompany titles.

Cotton Literature, Vol. 1, No. 1, January, 1931.- Compiled by Emily L. Day, Library Specialist in Cotton Marketing, Bureau of Agricultural Economics, Dept. of Agriculture, Washington, D.C.

This is the first issue of a monthly bibliography of literature pertaining to cotton, selected references being classified under the following general headings: Production, Preparation, Marketing and Utilization. Seed and seed products are also covered. The bibliography is prepared in the library of the Department of Agriculture with the cooperation of the Bureau of Agriculture Economics, Bureau of Plant Industry and Bureau of Entomology.

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"METHODS OF CORRELATION ANALYSIS" - EZEKIEL, John Wiley & Sons, 1930.

The author has done an admirable piece of work in simplifying the treatment of the study of the relations between variables, and their graphical treatment. He explains how precise investigation may be made of changes in a quantity due to variation of one or more factors, and makes clear the method of reasonable comparison of the results of process or treatment for groups consisting of only a small number of samples. The book is of direct value to anyone concerned with the interpretation of data resulting from textile or other researches.

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"MICELLAR STRUCTURE OF FIBERS IN THE LIGHT OF THE LATEST RESEARCH" - Bayerl and Roos, Die Kunstseide - Vol. 12, No. 11, 1930.

The article describes and illustrates the most recent picture of submicroscopic fiber structure as shown by X-ray research at the Berlin Technischen Hochschule.

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"A NEW METHOD FOR WOOL GRADING BY DETERMINATION OF THE FIBER THICKNESS" - K. Kusebauch, Melliand's Textilberichte - Vol. 12, No. 1, 1931.

The disadvantages of certain of the optical methods of fiber measurement both longitudinally and in cross section are pointed out. A method involving the measurement of the thickness of a bundle of 100 fibers by means of a special dead-weight gage having a specially shaped bed and foot for retaining the fiber bundle is described. Certain advantages of this method are noted. The instrument is calibrated to indicate the English, French, and German standards, and takes but a few minutes for a test.

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